



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,361	01/27/2004	Tzu-Fang Huang	AMAT/2592.C8/DSM/LOW K/JW	1559
44257	7590	03/23/2006	EXAMINER	
PATTERSON & SHERIDAN, LLP 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056			GHYKA, ALEXANDER G	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b> 10/765,361	<b>Applicant(s)</b> HUANG ET AL.	
	<b>Examiner</b> Alexander G. Ghyska	<b>Art Unit</b> 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

ALEXANDER GHYKA  
PRIMARY EXAMINER

Av 2812  
*[Signature]*

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

### **DETAILED ACTION**

Applicants' response of 12/27/2005 has been considered and entered in the record. The obviousness double patenting rejections have been withdrawn in view of the submitted Terminal Disclaimer. Applicants' arguments have been considered but they are not persuasive for the reasons as discussed below.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foo et al (US 5,124,014) for the reasons of record.**

The present claims generally require a process of reacting an cyclic organosilane with oxygen in the presence of an RF power at a pressure of between 2.5 and 10 Torr, wherein the oxygen is introduced into the chamber at a flowrate less than or equal to the flowrate of the cyclic organosiloxane into the chamber.

Foo et al disclose the deposition of a silicon oxide in the presence of RF power, at a pressure of less than 50 mtorr, using octamethylcyclotetrasiloxane, oxygen and a carrier gas. Foo et al also disclose rf power at 13.56 MHz, and 650 W. See column 3, lines 40-60 and column 4, 10-60.

Foo et al differ from the present claims in that oxygen is not introduced at a flowrate less or equal to the flowrate of cyclic organosiloxane; Foo et al prefers a higher flowrate of oxygen.

It would have been obvious for one of ordinary skill, at the time of the invention, to use a lower flowrate of oxygen as where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *Allen et al. v. Coe*, 57 USPQ 136. Moreover, a reference is not limited to preferred embodiments. See *In re Boe*, 148 USPQ 507 (CCPA 1966) . Unpreferred embodiments must be considered in determining obviousness. See *In re Burckel*, 201 USPQ 67 (CCPA 1979). In the present case, it would have been obvious for one of ordinary skill to use lower flowrates of oxygen, as adjusting the flowrate is within the skill of one of ordinary skill in the art. The lower flowrates of oxygen are workable ranges which can be ascertained by one of ordinary

Art Unit: 2812

skill in the art by routine experimentation. Therefore, a *prima facie* case of obviousness is established.

### ***Response to Applicants' Arguments***

Applicants argue that while Foo discloses and claims methods of forming silicon dioxide layers Foo et al does not teach or suggest controlling oxygen flow and other process conditions as recited in present Claims 1, 7 and 15 to deposit low dielectric constant films comprising silicon, oxygen and carbon. The Examiner maintains that both the present application and Foo discloses forming silicon dioxide by reacting a cyclic organosiloxane with oxygen in the presence of RF power at the same pressures. The Examiner maintains that since cyclic organosiloxane are used, and since organosiloxanes contain carbon, it is within the skill of one of ordinary skill in the art that the resulting silicon oxide layer would contain some carbon. As such, the newly amended limitation, "and wherein the low dielectric constant film comprises silicon, oxygen and carbon" would be obvious to one of ordinary skill in the art. The Examiner maintains that with respect to the RF power and the oxygen flow where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *Allen et al. v. Coe*, 57 USPQ 136. Moreover, a reference is not limited to preferred embodiments. See *In re Boe*, 148 USPQ 507 (CCPA 1966). Unpreferred embodiments must be considered in determining obviousness. See *In re Burckel*, 201 USPQ 67 (CCPA 1979). In the present case, it would have been obvious for one of ordinary skill to use lower flowrates of

Art Unit: 2812

oxygen, as adjusting the flowrate is within the skill of one of ordinary skill in the art. The lower flowrates of oxygen are workable ranges which can be ascertained by one of ordinary skill in the art by routine experimentation. Moreover, adjusting the RF power parameters to obtain optimum results would also be obvious for one of ordinary skill in the art, as simply a matter of optimization. Therefore, the rejection of the aforementioned Claims is maintained.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571)

Art Unit: 2812

272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG  
March 18, 2006

ALEXANDER GHYKA  
PRIMARY EXAMINER

Av 2812  
*[Handwritten signature]*